**In the Claims:**

Please amend claims 1-2, 5, 13-14, and 17-18. Please add new claims 28-30. The claims are as follows:

1. (Currently amended) A method for operating a Picosecond Imaging Circuit Analysis (PICA)/ high current source system comprising:

applying pulses from a high current pulse source to an <u>unpowered</u> Device Under Test (DUT);

employing a photosensor means for detecting photon emissions from said DUT;

receiving signals from said photosensor means to map photon emissions from said DUT; and

employing data processing means for relating said photon emissions to specific features of said DUT.

2. (Currently amended) ~~The method of claim 1,~~ <u>A method for operating a Picosecond Imaging Circuit Analysis (PICA)/ high current source system comprising:</u>

<u>applying pulses from a high current pulse source to a Device Under Test (DUT);</u>

<u>employing a photosensor means for detecting photon emissions from said DUT;</u>

<u>receiving signals from said photosensor means to map photon emissions from said DUT;</u>

<u>employing data processing means for relating said photon emissions to specific features of said DUT; and</u>

including high current source means for generating a pulse train which increases in

10/814,962                                    2

amplitude with time.

3. (Original) The method of claim 2, wherein said pulse train is periodic or aperiodic.

4. (Original) The method of claim 3, wherein where said pulse train is an ElectroStatic Discharge (ESD) event selected from the group consisting of a Human Body Model (HBM), a Machine Model (MM), a Charged Device Model (CDM), a Reverse Charge Device Model (RCDM), a Socketed Device Model (SDM), a Charged cable Discharge Event (CDE), and a Transmission Line Pulse (TLP).

5. (Currently amended) ~~The method of claim 1 comprising the steps as follows:~~ A method for operating a Picosecond Imaging Circuit Analysis (PICA)/ high current source system comprising:

  applying pulses from a high current pulse source to a Device Under Test (DUT);

  employing a photosensor means for detecting photon emissions from said DUT;

  receiving signals from said photosensor means to map photon emissions from said DUT;

  employing data processing means for relating said photon emissions to specific features of said DUT;

  providing a current probe to measure current in said DUT;

  providing a voltage probe to measure voltage in said DUT;

  providing a leakage measurement means for evaluation of a device;

  providing a photon signal collection process in time from said device;

  providing a step increase in the high current pulse source amplitude after adequate

10/814,962                                    3

emission data is established;

    providing a Computer Aided Design (CAD) system to visualize the emissions on the chip mapping;

    providing a means to store voltage, current, leakage and photon emissions from said device;

    providing an averaging means of voltage, current, leakage, and photon measure;

    providing a means of visualization of a photon intensity spatially;

    providing a means to plot voltage, current, leakage an a measure of photon emissions from said device; and

    whereby high current pulse and picosecond imaging circuit analysis is provided.


6. (Original) A method for evaluation of photon emissions and high current robustness of a semiconductor chip comprising the steps as follows:

    providing electrical signals to pads of said semiconductor chip;

    eliminating power supply D.C. voltage levels to said chip to set said chip into an unpowered state;

    providing a pulse train source producing pulses with a fixed pulse width and fixed rise and fall times for a pre-determined pulse current magnitude into said pads of said semiconductor chip;

    providing filtered light emissions by filtering light emissions of a first frequency range from said semiconductor chip;

10/814,962                                    4

collecting said filtered light emissions and determining an adequate number of pulses to

provide adequate signal magnitude for analysis;

evaluating functionality of said semiconductor chip to evaluate parametric shifts or

destruction;

increasing said current magnitude of said pulse train and repeating aforementioned steps

until destruction of said semiconductor chip; and

repeating all the above steps with a second filter frequency range.

7. (Original) The method of claim 6 wherein said pulse train source provides pulses with a

plurality of pulse widths.

8. (Original) The method of claim 6 wherein said pulse train source provides pulses with a

plurality of pulse rise times.

9. (Original) The method of claim 6 wherein a filter is used to determine electron-hole pair

recombination.

10. (Original) The method of claim 9 wherein said filter is used to determine avalanche

breakdown.

11. (Original) The method of claim 9 wherein said filters are rg780 and bg39.

10/814,962                                    5

12. (Original) A method of providing a picosecond imaging circuit analysis / high current source

system and emulator comprising the steps as follows:

    providing a high current pulse source;

    providing a photon signal collection process in time;

    providing a step increase in the high current pulse source amplitude after adequate

emission data is established;

    providing a Computer Aided Design (CAD) system to visualize the emissions on the chip

mapping;

    providing an electrothermal circuit simulation;

    providing a post-processor to generate the photon emission rate;

    providing a emulated mapping of said photon collection process in time; and

    providing a comparator between said actual photon mapping and said emulated photon

mapping.


13. (Currently amended) A computer program product comprising a computer useable medium

having computer readable program code embodied therein for operating a picosecond imaging

circuit analysis / high current source system, the program product comprising:

    a) program code configured to provide a high current pulse source;

    b) program code configured to employ a photosensor means for detecting photon

emissions from an unpowered device under test (DUT);

    c) program code configured for receiving signals from said photosensor means to map

photon emissions from said DUT; and

10/814,962                                    6

d) program code configured for employing data processing means for relating said photon emissions to specific features of said DUT.

14. (Currently amended) ~~The computer program product of claim 13 including~~ A computer program product comprising a computer useable medium having computer readable program code embodied therein for operating a picosecond imaging circuit analysis / high current source system, the program product comprising:

   a) program code configured to provide a high current pulse source;

   b) program code configured to employ a photosensor means for detecting photon emissions from a device under test;

   c) program code configured for receiving signals from said photosensor means to map photon emissions from said DUT;

   d) program code configured for employing data processing means for relating said photon emissions to specific features of said DUT; and

   e) program codes configured to operate high current source means for generating a pulse train which increases in amplitude with time.

15. (Original) The computer program product of claim 14 including program codes configured to said pulse train are periodic or aperiodic.

16. (Original) The computer program product of claim 15 including program code configured whereby said pulse train is an ElectroStatic Discharge (ESD) event selected from the group

10/814,962                                7

consisting of a Human Body Model (HBM), a Machine Model (MM), a Charged Device Model (CDM), a Reverse Charge Device Model (RCDM), a Socketed Device Model (SDM), a Charged cable Discharge Event (CDE), and a Transmission Line Pulse (TLP).

17. (Currently amended) A picosecond imaging circuit analysis / high current source analysis apparatus comprising:

a high current source means  for applying a pulse to an unpowered Device Under Test (DUT);

photosensor means for detecting  photon emissions from a DUT;

a data acquisition circuit for receiving signals from said photosensor means for mapping of photon emissions from said DUT; and

data processing means connected to said data acquisition circuit for relating said photon emissions to specific features of said DUT.

18. (Currently amended) ~~The apparatus of claim 17~~ A picosecond imaging circuit analysis / high current source analysis apparatus comprising:

a high current source means  for applying a pulse to a Device Under Test (DUT);

photosensor means for detecting  photon emissions from a DUT;

a data acquisition circuit for receiving signals from said photosensor means for mapping of photon emissions from said DUT; and

data processing means connected to said data acquisition circuit for relating said photon emissions to specific features of said DUT.18. The apparatus of claim 17, wherein said high

10/814,962                           8

current source means generates a pulse train which increases in amplitude with time, wherein said high current source means generates a pulse train which increases in amplitude with time.

19. (Original) The apparatus of claim 18, wherein said pulse train is periodic or aperiodic.

20. (Original) The apparatus of claim 19 wherein where said pulse train is an ElectroStatic Discharge (ESD) event selected from the group consisting of a Human Body Model (HBM), a Machine Model (MM), a Charged Device Model (CDM), a Reverse Charge Device Model (RCDM), a Socketed Device Model (SDM), a Charged cable Discharge Event (CDE), and a Transmission Line Pulse (TLP).

21. (Original) The apparatus of claim 18, wherein an algorithm is provided to relate said photon emission to said power to failure.

22. (Original) A high current pulse electrical and picosecond imaging circuit analysis comprising:

a pulse source;

a transmission line cable from the said pulse source to a structure with a high voltage switch connected in said transmission line cable;

an oscilloscope;

a current probe;

a voltage probe;

10/814,962                                    9

a leakage measurement source;

photo-detector array;

a data-acquisition system connected for collecting data from the imaging detector and data including oscilloscope voltage and current signals, leakage measurements; and

means for providing visualization of photon emissions in time.

23. (Original) An apparatus to emulate a picosecond imaging circuit analysis / high current source analysis apparatus comprising:

a high current source forming a pulse train;

a collection source for evaluating photon emissions;

a computer aided design (CAD) system for visualizing chip mapping;

an electrothermal circuit simulator;

a post-processing system for calculating photon emission from a circuit simulator; and

a second computer aided design (CAD) system for visualizing emulated photon emissions from said post-processing system.

24. (Original) The apparatus of claim 23 wherein said system provides a filter for emission energy for said first and said second CAD systems.

25. (Original) The apparatus of claim 23 wherein a comparator system compares an actual photon emission map from said first computer aided design (CAD) system from the photon emissions, and from said second computer aided design (CAD) system from an emulated photon

10/814,962                              10

emission map.

26. (Original) The apparatus of claim 25 wherein said system provides a filter for emission energy for said first and said second CAD systems.

27. (Original) The apparatus of claim 23 wherein a third CAD system provides the means to calculate current and voltage on a given node from said photon emission mapping whose results are compared to said electrothermal circuit simulation results.

28. (New) A method for operating a Picosecond Imaging Circuit Analysis (PICA)/ high current source system comprising:

applying pulses from a high current pulse source to a powered Device Under Test (DUT);

employing a photosensor means for detecting photon emissions from said DUT;

receiving signals from said photosensor means to map photon emissions from said DUT; and

employing data processing means for relating said photon emissions to specific features of said DUT.

29. (New) A picosecond imaging circuit analysis / high current source analysis apparatus comprising:

a high current source means for applying a pulse to a powered Device Under Test (DUT);

photosensor means for detecting photon emissions from a DUT;

10/814,962                              11

a data acquisition circuit for receiving signals from said photosensor means for mapping of photon emissions from said DUT; and

data processing means connected to said data acquisition circuit for relating said photon emissions to specific features of said DUT.


30. (New) A computer program product comprising a computer useable medium having computer readable program code embodied therein for operating a picosecond imaging circuit analysis / high current source system, the program product comprising:

a) program code configured to provide a high current pulse source;

b) program code configured to employ a photosensor means for detecting photon emissions from a powered device under test (DUT);

c) program code configured for receiving signals from said photosensor means to map photon emissions from said DUT; and

d) program code configured for employing data processing means for relating said photon emissions to specific features of said DUT.

10/814,962                              12